WHAT IS CLAIMED IS:

1. A fuel cell system, comprising:

a fuel cell having a water passage and a passage for gas required to generate power,

a first protection device which prevents freezing of water in the fuel cell by maintaining the temperature of the fuel cell,

a second protection device which prevents freezing of water in the fuel cell by draining water in the fuel cell, and

a controller functioning to:

select one of the first protection device and second protection device as the protection device to be used when the fuel cell has stopped, and

protect the fuel cell by operating the selected protection device when the fuel cell has stopped.

2. The fuel cell system as defined in Claim 1, wherein the first protection device comprises a heater which increases the temperature of the fuel cell.

3. The fuel cell system as defined in Claim 2, wherein the first protection device comprises a heat insulator which suppresses temperature drop of the fuel cell.

4. The fuel cell system as defined in Claim 2, wherein the first protection device controls the heater so that the temperature of the water is higher than 0°C.

5. The fuel cell system as defined in Claim 1, wherein the second protection device

comprises a vessel which reserves water drained from the fuel cell.

6. The fuel cell system as defined in Claim 5, comprising a thawing device which thaws the water frozen in the vessel.

7. The fuel cell system as defined in Claim 6, further comprising a reformer which supplies reformate gas comprising hydrogen to the fuel cell, wherein the thawing device thaws the frozen water using the heat generated by the reformer.

8. The fuel cell system as defined in Claim 1, wherein the water passage and gas passage are installed on either side of a porous member.

9. The fuel cell system as defined in Claim 1, further comprising:

a humidifier which humidifies the gas supplied to the fuel cell, and

a water recovery device which recovers water from the gas which has flowed out from the fuel cell.

10. The fuel cell system as defined in Claim 1, further comprising:

a sensor which measures the temperature of the fuel cell, and wherein

the controller further functions to protect the fuel cell by the first protection device or the second protection device when the temperature of the fuel cell is lower than a predetermined temperature.

11. The fuel cell system as defined in Claim 10, wherein the sensor which detects the temperature of the fuel cell is a sensor which measures the temperature of the water

flowing through the fuel cell.

12. The fuel cell system as defined in Claim 1, wherein the controller further functions to:

select the first protection device when the stop interval of the fuel cell is shorter than a predetermined interval, and select the second protection device when it is longer than the predetermined interval.

13. The fuel cell system as defined in Claim 12, further comprising a sensor which measures the outside air temperature, and wherein the controller further functions to set the predetermined interval to be shorter the lower the outside air temperature becomes.

14. The fuel cell system as defined in Claim 12, wherein the stop interval of the fuel cell is the time from when the fuel cell stops generating power to when it starts on the next occasion.

15. The fuel cell system as defined in Claim 12, wherein the controller further functions to:

predict the restart time of the fuel cell based on past information relating to the start time of the fuel cell, and

computes the stop interval of the fuel cell based on the stop time and predicted restart time of the fuel cell.

16. The fuel cell system as defined in Claim 12, further comprising an input device

for inputting the stop interval of the fuel cell.

17. The fuel cell system as defined in Claim 1, further comprising a manually operable selector which selects one of the first protection device and second protection device, and wherein the controller further functions to select the protection device selected by the selector.

18. The fuel cell system as defined in Claim 1, wherein the controller further functions to:

compute an energy required when the fuel cell is protected using the first protection device,

compute an energy required when the fuel cell is protected using the second protection device, and

select the one of the first protection device and second protection device which has the lesser required energy.

19. The fuel cell system as defined in Claim 18, wherein the controller further functions to:

predict a variation of outside air temperature during the stop interval of the fuel cell, and

compute the energy required when the fuel cell is protected using the first protection device based on the variation of outside air temperature during the predicted stop interval.

20. The fuel cell system as defined in Claim 19, wherein the controller further

functions to:

predict the variation of outside air temperature during the stop interval based on past information relating to the variation of outside air temperature.

21. The fuel cell system as defined in Claim 19, further comprising a receiving device which receives a signal relating to future outside air temperature from outside the system, and the controller further functions to:

predict the variation of outside air temperature during the stop interval based on the signal received by the receiving device.

22. The fuel cell system as defined in Claim 18, wherein the controller further functions to:

predict an outside air temperature at the restart time, and

compute the energy required when the fuel cell is protected using the second protection device based on the predicted outside air temperature at the restart time.

23. The fuel cell system as defined in Claim 22, wherein the controller further functions to:

predict the outside air temperature at the restart time from the correlation between time and outside air temperature.

24. The fuel cell system as defined in Claim 22, further comprising a receiving device which receives a signal relating to future outside air temperature from outside the system, and the controller further functions to:

predict the outside air temperature at the restart time based on the signal

received by the receiving device.

25. The fuel cell system as defined in Claim 2, further comprising:

a storage device which stores fuel supplied to the heater, and

a sensor which detects a remaining fuel amount in the storage device, and the controller further functions to:

stop protection by the first protection device, and start protection by the second protection device, when the detected remaining fuel amount is lower than a predetermined amount even when protection is being performed by the first protection device.

26. The fuel cell system as defined in Claim 2, further comprising:

a battery which supplies electricity to the heater, and

a sensor which detects a charge state of the battery, and the controller further functions to:

stop protection by the first protection device, and start protection by the second protection device, when the detected charge state is lower than a predetermined value even when protection is being performed by the first protection device.

27. The fuel cell system as defined in Claim 2, further comprising:

a sensor which detects an oxygen concentration in the outside air, and the controller further functions to:

stop protection by the first protection device, and start protection by the second protection device, when the detected concentration is lower than a predetermined concentration even when protection is being performed by the first protection device.

28. A fuel cell system, comprising:

a fuel cell having a water passage and a passage for gas required to generate power,

a first protection device which prevents freezing of water in the fuel cell by maintaining the temperature of the fuel cell,

a second protection device which prevents freezing of water in the fuel cell by draining water in the fuel cell, and

a manually operable selector which selects one of the first protection device and second protection device as the protection device to be used when the fuel cell has stopped.

29. A fuel cell system, comprising:

a fuel cell having a water passage and a passage for gas required to generate power,

first protection means which prevents freezing of water in the fuel cell by maintaining the temperature of the fuel cell,

second protection means which prevents freezing of water in the fuel cell by draining the water in the fuel cell, and

means which selects one of the first protection means and second protection means as the protection means to be used when the fuel cell has stopped.

30. A method of protecting a fuel cell from freezing of water, comprising:

selecting one of a first protection method and a second protection method,

preventing freezing of water in the fuel cell by maintaining the temperature of

the fuel cell when the first protection method is selected, and

preventing freezing of water in the fuel cell by draining the water in the fuel cell when the second protection method is selected.

31. A protection method as defined in Claim 30, wherein, when the first protection method is selected, the fuel cell is heated to raise its temperature higher than 0°C.

32. A protection method as defined in Claim 31, wherein, when the first protection method is selected, the fuel cell is insulated from the outside air to suppress temperature drop of the fuel cell.

33. A protection method as defined in Claim 31, wherein, when the first protection method is selected, the water is heated to raise its temperature higher than 0°C.

34. A protection method as defined in Claim 30, wherein, when the second protection method is selected, water drained from the fuel cell is reserved in a vessel.

35. A protection method as defined in Claim 34, wherein, when the fuel cell is restarted, water which has frozen in the vessel is heated to thaw it.

36. A protection method as defined in Claim 34, wherein the frozen water is thawed using the heat generated by a reformer which supplies reformate gas comprising hydrogen to the fuel cell.

37. A protection method as defined in Claim 30, further comprising:

measuring the temperature of the fuel cell, and wherein

the fuel cell is protected using the first protection method or second protection method when the temperature of the fuel cell is lower than a predetermined temperature.

38. A protection method as defined in Claim 37, wherein the temperature of the water flowing through the fuel cell is measured as the temperature of the fuel cell.

39. A protection method as defined in Claim 30, wherein the first protection method is selected when the stop interval of the fuel cell is shorter than a predetermined interval, and the second protection method is selected when it is longer than the predetermined interval.

40. A protection method as defined in Claim 39, further comprising:

measuring the outside air temperature, and

setting the predetermined interval shorter the lower the outside air temperature becomes.

41. A protection method as defined in Claim 39, wherein the stop interval of the fuel cell is a time from when the fuel cell stops generating power to when it restarts.

42. A protection method as defined in Claim 39, further comprising:

predicting the restart time of the fuel cell based on past information relating to the start time of the fuel cell, and

computing the stop interval of the fuel cell based on the stop time and

predicted restart time of the fuel cell.

43. A protection method as defined in Claim 39, further comprising:

inputting the stop interval of the fuel cell from an input device.

44. A protection method as defined in Claim 30, further comprising:

computing an energy required when the fuel cell is protected using the first protection method,

computing an energy required when the fuel cell is protected using the second protection method, and wherein

the one of the first protection method and second protection method which has the lesser required energy, is selected.

45. The protection method as defined in Claim 44, further comprising:

predicting a variation of outside air temperature during the stop interval of the fuel cell, and wherein

the energy required when the fuel cell is protected using the first protection method is computed based on the variation of outside air temperature during the predicted stop interval.

46. The protection method as defined in Claim 45, wherein:

the variation of outside air temperature during the stop interval is predicted based on past information relating to the variation of outside air temperature.

47. The protection method as defined in Claim 45, further comprising:

receiving a signal relating to future outside air temperature from outside the system by a receiving device, and wherein the variation of outside air temperature during the stop interval is predicted based on the signal received by the receiving device.

48. The protection method as defined in Claim 44, further comprising:

predicting the outside air temperature at the restart time, and

computing the energy required when the fuel cell is protected using the second protection device based on the predicted outside air temperature at the restart time.

49. The protection method as defined in Claim 48, wherein the restart time is predicted from the correlation between time and outside air temperature.

50. The protection method as defined in Claim 48, further comprising:

receiving a signal relating to future outside air temperature from outside the system by a receiving device, and wherein

the outside air temperature at the restart time is predicted based on the signal received by the receiving device.

51. The protection method as defined in Claim 31, further comprising:

detecting a remaining fuel amount used for heating the fuel cell, and

changing over the protection method from the first protection method to the second protection method when the detected remaining fuel amount is lower than a predetermined amount even when protection is being performed by the first protection method.

52. The protection method as defined in Claim 31, further comprising:

detecting a remaining electric power used for heating the fuel cell, and

changing over the protection method from the first protection method to the second protection method when the detected remaining electric power is lower than a predetermined amount even when protection is being performed by the first protection method.

53. The protection method as defined in Claim 31, further comprising:

detecting the oxygen concentration in the outside air, and

changing over the protection method from the first protection method to the second protection method when the detected oxygen concentration is lower than a predetermined concentration even when protection is being performed by the first protection method.